Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/US05/016453

International filing date: 11 May 2005 (11.05.2005)

Document type: Certified copy of priority document

Document details: Country/Office: US
Number: 60/570,082
Filing date: 12 May 2004 (12.05.2004)

Date of receipt at the International Bureau: 27 June 2005 (27.06.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)

World Intellectual Property Organization (WIPO) - Geneva, Switzerland
Organisation Mondiale de la Propriété Intellectuelle (OMPI) - Genève, Suisse

1333534

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

June 14, 2005

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE.

APPLICATION NUMBER: *60/570,082*
FILING DATE: *May 12, 2004*
RELATED PCT APPLICATION NUMBER: *PCT/US05/16453*

Certified by

Jon W. Dudas

Under Secretary of Commerce
for Intellectual Property
and Director of the United States
Patent and Trademark Office

Attorney Docket No. GRA26 028

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Sir:

Transmitted herewith for filing is the PROVISIONAL APPLICATION

for a patent of Inventor(s):

JOSEPH P. KENNEDY, JR., MARTIN ALLES, and JOHN CARLSON

Title: SYSTEM AND METHOD FOR IDENTIFYING THE PATH OR DEVICES ON THE PATH OF A COMMUNICATION SIGNAL

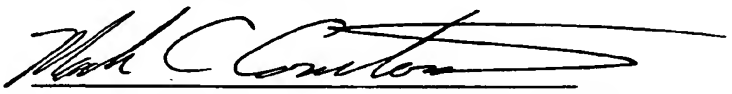
Enclosed are:

[X] A Cover Page and Two (2) pages of specification.

[X] A check in the amount of $160.00 to cover the filing fee.

The Commissioner is hereby authorized to charge payment of any additional fees associated with this communication or to credit any overpayment to Deposit Account No. 04-1679. A duplicate of this sheet is enclosed.

Respectfully submitted,



Mark C. Comtois Reg. No. 46,285
L. Lawton Rogers, III Reg. No. 24,302
D. Joseph English Reg. No. 42,514
Patrick D. McPherson Reg. No. 46,255

DUANE MORRIS LLP
1667 K Street, N.W., Suite 700
Washington, DC 20006
Telephone: (202) 776-7800
Telecopier: (202) 776-7801

Dated: May 12, 2004

UNITED STATES

PROVISIONAL PATENT APPLICATION

of

Joseph P. Kennedy Jr.
11127 Elmview Place
Great Falls, Virginia 22066

Martin Alles
2421 Williams Avenue
Vienna, Virginia 22180

John Peter Carlson
12006 Trossack Road
Herndon, Virginia 20170

for

SYSTEM AND METHOD FOR IDENTIFYING THE PATH OR DEVICES ON THE PATH OF A COMMUNICATION SIGNAL

Attorney: Mark C. Comtois Reg. No. 46,285
L. Lawton Rogers, III Reg. No. 24,302
D. Joseph English Reg. No. 42,514
Patrick D. McPherson Reg. No. 46,255

Attorney Docket Number: GRA26 028

Correspondence Address:

DUANE MORRIS LLP
1667 K Street, N.W., Suite 700
Washington, D.C. 20006
Telephone: (202) 776-7800
Telecopier: (202) 776-7801

An invention whose application is to the identification of the path (or devices on the path) of a communication signal

1.0 Context

(a) This application relates to the communication of information over a communication medium, wireless or otherwise.
(b) A communication system is the entirety of a transmitter, a communication path or link/channel, devices along the path through which the signal passes and a receiver.
(c) The communication link/path introduces distortions on signals whose origins may be thermal noise or other interfering signals.
(d) Primary information is the information content for which the communication system was intended. For example, in a cellular communication system, the primary information may be speech. A Primary receiver is one whose design is motivated for the sole purpose of extracting primary information.
(e) The Primary signal is that signal emanating from the transmitter and decoded by the primary receiver which contains the Primary information.
(f) Secondary information is information encoded onto/over/into the Primary signal in such a manner that it is:
    (1) Transparent to the Primary receiver. The operation of the Primary receiver remains *identical* in the presence or absence of the secondary information.
    (2) Recoverable only by a Secondary receiver which has access to both the input *and* the output of the Primary receiver.
    (3) Inserted as a Secondary signal or signals at one or more devices in the path of the primary signal as it traverses from the transmitter to the Primary receiver.

2.0 Injection of the Secondary signal

(a) The Secondary signal is formed as a function of *both* the device through which the primary signal passes *and* the Primary signal. Mathematically, if $w(t)$ represents the Secondary signal injected at device i, $w(t)=f(i, s(t))$. The function $f(.)$ represents the mapping and $s(t)$ the Primary signal.
(b) The Secondary signal is modified such that it appears to be a component of the distortion of whatever nature, experienced on the channel/link. As one example, if the distortion is additive noise, the modification is to scale the Secondary signal so that it is below the power level of the noise. The notation $w(t)$ will also denote the modified signal.
(c) The Secondary signal is transmitted within the same channel as the Primary signal. By channel we mean the same time period and bandwidth or any other generic Primary signal characterization.
(d) The function $f(.)$ generating the Secondary signal has the property that given the output of the Primary receiver, the function can be inverted so that the particular device i may be identified.

3.0 Recovery of the Secondary signal

(a) A Secondary receiver has access to both the input *and* the output of the Primary receiver.
(b) The Secondary receiver removes the primary signal (reconstructed if need be from the output of the Primary receiver) from the input signal at the Primary receiver, thus exposing the Secondary signal.
(c) The Secondary receiver implements the inverting function given by $[\, i \,]=g(w(t),s(t))$, where $g(.)$ inverts $f(.)$.
(d) The Secondary receiver identifies the device associated with the determination i.
(e) Multiple devices in the path may be identified using appropriate functions $g(.)$ that represent the needed inversions for each function $f(.)$ each of which may have been operating at different device locations along the Primary signal path.